SOUTHEASTERN
REGIONAL
BIOMASS ENERGY
PROGRAM

SERBEP Update

OCTOBER 1997

A Publication for the General Biomass Community

The Southeastern Regional Biomass Energy Program is one of five regional biomass energy programs. It is administered for the U.S. Department of Energy Office of Energy, Efficiency, and Renewable Energy Programs, by the Tennessee Valley Authority's Environmental Research Center in Muscle Shoals, Alabama. The 13-state region includes Florida, Kentucky, Mississippi, Georgia, North Carolina, South Carolina, Virginia, West Virginia Missouri, Tennessee, Louisiana, Arkansas, Alabama, and Washington, D.C.

For More Information Contact:
Phillip Badger, Manager
(205) 386-3086
pcbadger@tva.gov
David Stephenson, Assistant Manager
(205) 386-3087
cdstephenson@tva.gov
SERBEP fax:
(205) 386-2963

PROJECTS RECENTLY FUNDED BY SERBEP RFP

Last month we published a partial list of projects funded under the Southeastern Regional Biomass Energy Program's (SERBEP) recent Request for Proposals (RFP). Following are brief summaries of additional projects funded.

Customer Trial & Pilot Production of Cetane Improvers Produced from Soybean Oil, University of Kansas Center for Research, Inc., Lawrence, Kansas. Laboratory synthesis and testing have shown that soybean oil derivatives can be nitrated to form effective cetane improvers for diesel fuels. The better of these cetane improvers has a performance comparable to 2-ethylhexylnitrate (EHN) with significantly lower feedstock costs. The goals of this project include the assembly of a small pilot facility, production of five-gallon quantities of cetane improver, and subsequent demonstration of the product. Previous work has been performed at the laboratory bench scale. The most promising of the products will be produced in the pilot facility. The process will be tested in a manner which will optimize the production process, including evaluations of nitration temperatures, reaction time, and stoichiometric ratios. Small quantities of the product will be provided to customers, such as Farmland Industries, to be tested and evaluated for use in premium diesel fuels.

Activated Carbon from Wood Gasification, Research Triangle Institute (RTI), Research Triangle Park, North Carolina. The development of bioenergy can be enhanced by the development of co-products from bioenergy processes. One of these products is the production of a high value activated carbon from wood gasification processes. RTI is currently involved with the startup of a downdraft gasifier unit which will supply a fuel gas to an engine generator set at Camp Lejeune, North Carolina. RTI proposes to produce an activated carbon with an iodine number of 800-1000. Activated carbon with an iodine number of 800-850 is considered excellent for wastewater treatment applications. Normally, in thermal gasification applications the gas must be reduced in temperature before firing in an engine. The thermal heat transfer needed to cool the gas can be used to create the char activation temperatures needed. During this project's duration the operating parameters of the gasifier will be varied to determine the optimal conditions for activated carbon production. The carbon activation parameters will be used to deliver a conceptual design for an acti-

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New EPA Water Test Methods/Analysis CD-ROM—Over 330 US EPA drinking water and wastewater test methods are featured on the agency's just-released *Methods and Guidance for Analysis of Water* CD-ROM. The CD contains Series 500, 600, 1660 test methods; 40 CFR Parts 136-149; methods of chemical analysis of water and wastes; metals, inorganic and organic substances in environmental samples; and whole effluent toxicity methods. It's in PDF format for easy search and retrieval. See <http://www.env-sol.com/solutions/EPAW.HTML> for details, or contact Fran Martin, FM Research & Consulting, Richmond, Virginia at <fmartin@ccsinc.com>.

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Error Correction—In the August 1997 issue of *SERBEP Update*, the sidebar on page two entitled *USAID Publication Available* listed an incorrect phone number for Winrock International. The correct phone number should be (703) 525-9430. We apologize for any inconvenience.

vation process along with cost projections. Parameters such as fuel size, moisture content, gasifier maximum operating temperature, and char bed depth will be examined. Each sample produced (6-10) will be steam activated by MDB, Inc., (a cooperator in Smyrna, Georgia) and the iodine number measured along with porosity and surface area. Based on information from this testing a conceptual design for a steam activation reactor will be developed along with market projections for the activated carbon and economics of the process.

Biomass Gasification System Modification for Clean Gas, Primenergy, Inc., Tulsa, Oklahoma. In order for biomass energy systems to compete in the U.S. energy markets, higher efficiency systems must be developed. One of the ways to improve the efficiency is the use of hot gas cleanup, which not only improves the thermal efficiency of the process, but can allow the use of fuels which heretofore had been very difficult to use due to their slagging characteristics. These fuels are usually much less expensive or even have negative value (tipping fee) relative to clean biomass such as wood chips. This project addresses two process designs for producing clean gas from a gasifier unit. The first method uses small ceramic filters (European technology) downstream of the gasifier in conjunction with injection of lime upstream of the gasification to promote sulfur and chlorine removal. The second method is the more conventional wet scrubbing with a venturi and caustic. The project test plan will require almost 50 tons of the selected biomass feedstocks (switchgrass, rice hull chicken litter, and rice or wheat straw). The feedstock will be analyzed for composition and heating value. Conceptual process drawings will be developed and the appropriate equipment procured and installed prior to running the selected biomass feedstock through the gasifier. The gaseous effluent will be analyzed for O_2, particulate matter, SO_2, NO_x, CO, and total hydrocarbons. Analysis of the hot clean gas will be performed on the producer gas after it has been fired to produce steam. The wet scrubbing analysis will be performed on the exhaust from an engine generator set. The data on the clean gas will be analyzed to evaluate suitability for clean gas uses and the engine will be evaluated for the effect of the gas on internal parts.

Alternate Feedstocks to Buffer Commercialization of Switchgrass for Energy, Bioenergy Consulting LLC, Auburn, Alabama. Switchgrass has great potential as a herbaceous energy crop in Alabama and Mississippi, but at present very little is being grown for energy in the Southeast. Several bioenergy options appear to be very close to commercialization, including co-firing with coal, gasification and electric power production, and ethanol production. Previous studies have suggested that switchgrass production will occur primarily on converted row crop land in the wiregrass (southeast) area of Alabama. This seems highly unlikely due to the existing economics of row cropping (wiregrass area) versus beef pasture (black belt area) plus the fact that very little switchgrass seed is currently available to support the planting of significant acreage of energy crops. This project will evaluate the potential to use other feedstocks in the interim period of 3-5 years in order to educate and condition both the producers and users of biomass feedstocks to produce an infrastructure which will receive switchgrass easily as more switchgrass becomes available (i.e., the alternate feedstocks act as buffers or a bridge to the future development of biomass energy markets). The specific goals are to collect and analyze the necessary data to determine the feasibility of alternate feedstocks, such as bark, cotton stubble, or hay crops to buffer commercialization of switchgrass for energy in Alabama. The individual tasks include literature searches and surveys to verify the data on existing acreage and crops currently in production and potentially available. This will be followed by an intense economic analysis of each feedstock and the use of computer modeling to predict the

widespread economic effect on the agricultural economy of Alabama.

Sourcebook of Regulations and Disposal Practices for Treated Wood, C.T. Donovan Associates, Burlington, Vermont. Wood treated with creosote, pentachlorophenol (penta), and chromated copper arsenate (CCA) preservatives is found in urban and industrial waste streams. Although much of the wood which ends up in the waste stream could be used for fuel or feedstock, the presence of treated wood prevents the use of this waste stream for these purposes. The goal of this project is to develop a user friendly sourcebook on the characteristics of wood treated with creosote, penta, or CCA; regulations affecting management and disposal of these materials; and disposal practices and potential end uses for these materials (including fuel). A list of solid waste management facilities that accept wood residues containing these preservatives will also be compiled as well as information on existing end uses for wood containing these preservatives and a listing of past and present research, development.

WOOD BIOFUEL MARKETING DIRECTORY

SERBEP recently received a thoughtful study of residential biofuels use in Oregon that has implications for biofuels marketing in the nation at large concerning both the availability and marketing approaches of biofuels, which in this case is wood harvested from forests and waste generated in processing of forest wood. The report is entitled *Residential Biofuels Marketing & Delivery Method Study*, By Alex Sifford of the Oregon Department of Energy. Sifford begins his narrative with a brief account of the pioneers who traveled across the arid plains to Oregon and chopped down trees, followed by a lengthy summation of wood as a fuel through the ages to the present situation. This more or less demolishes the shibboleths of a decade ago when heating totally with wood was an "in thing" as a brief reaction to the energy shortage. At the same time, he suggests a bright future for part-time residential and recreational use of wood for heating, ambiance, and outdoor cooking. It's all in the marketing aspects to meet a changed situation.

While some rural people still rely on wood as a primary or secondary fuel, Sifford says, the real market potential lies in people who buy wood for what is essentially pleasure—the ambiance of fireplaces and the sense of roughing it in parks, where firewood gathered from the surroundings is increasingly difficult to find or is illegal. The market, he suggests, has to respond to the situation.

Cordwood, the traditional—and chaotic—market is discussed at some length. There seems to be a wide variation in type, quality, and prices, and suppliers are so diverse that formal retail dealers are few. (In Salem with a population of 100,000 Sifford found only one firewood dealer in the yellow pages.) This is somewhat misleading, as he points out, since most of them are found only by word of mouth and many drift in and out of the business as their whims and money needs dictate. (In the Southeast, for example, want ads propagate as cold weather approaches, and anyone wanting a pickup load of cordwood can get it.) There are, however, no trade associations, fuel standards, or weights and volumes that apply to this informal and opportunistic industry.

What Sifford sees is increasing prices and upscale marketing techniques that, not only in the Pacific Northwest but nationwide, take advantage of shifting demographics and life styles: small packages of 5 or 10 pounds of cordwood or slabs in plastic shrinkwrap; bagged pellets; and compressed logs in a box outside the convenience stores, supermarkets, chain stores, and do-it-yourself outlets of the nation; and sold at a price that the fellow in a pickup unloading cordwood in somebody's carport can only dream of.

This leads to a fundamental marketing shift; the fellow in the pickup can maybe travel 20 or 30 miles; a ton of condensed wood on a pallet can travel hundreds of

Restructuring Electricity Markets: A World Perspective—This book, published by Visions Communications, explains and addresses many issues and factors that affect the utility industry today. It provides historic perspective, up-to-date information, and insight on issues that the industry is currently grappling with and its future implications. Issues such as electrical utility regulations, competition, and changes; industry reforms; privatization; and future industry changes are explored. The publication also provides lessons learned from experiences of other developed and developing nations. The book is written to keep you informed and current on the challenges facing electricity markets today and the changes that will take place and be debated in the future.To order, contact Visions Communications, 205 East 10th Street, Suite 2D, New York, NY 10003, ATTN: Beth Bay, fax (212) 529-4029. Cost is $59 plus $3 postage and handling.

Proceedings Available—*The Third Biomass Conference of the Americas, Making a Business from Biomass in Energy, Environment, Chemicals, Fibers, and Materials*, was held in Montreal, August 25-28, 1997. The conference was an international forum supporting the development of a viable biomass-based industry. The two-volume proceedings may be obtained by ordering from: Elsevier Science, Regional Sales Office, Customer Support Dept., P.O. Box 945, New York, NY 10159-0945, phone (+1) 212-633-3730; toll free for North American customers at 1-888-4ES-INFO; fax (+1) 212-633-3680; email at <usinfo-f@elsevier.com. If you are outside of the Americas, visit the Web site at <http://www.elsevier.nl>. The price is $400 US, which includes shipping and handling charges if payment is made at the time of order. Credit cards are accepted.

miles. It also leads to standardization and reliability not seen in the pickup load, and to trade associations and organizations that specify the fuel characteristics and standards, such as the Pellet Fuels Institute and the Hearth Products Association. Not only do trade associations standardize products, but most tend to promote them through advertising and other similar means of bringing the product before the public that individual producers can only partially perform.

An interesting sidelight to cordwood from mill waste is the declining volume that has virtually eliminated this traditional source of fuel, in Oregon at least. Increased mill efficiency, wider use of second-growth timber, and increased use of mill wastes for industrial fuel, have virtually eliminated mill wastes as a source of bulk wood. In 1968, 19 percent of mill waste was unused (hence available for bulk wood consumption); in 1992 0.1 percent was unused.

This leads to Sifford's main theme: upscale manufactured wood products such as pellets and densified logs made from various mill wastes and occasionally from agricultural wastes, or packaged bulk wood. He seems to see a limited future in bulk sales, which traditionally have involved delivery of a ton or so of sawdust or a cord or two of bulk wood to be stored on site. Most people don't want to deal with a great pile of wood laying around. Increasingly people are turning to the processed and packaged product with a maximum weight of 40 pounds, basing it on a 40-pound sack of dog food, the largest most people can carry and put in their car. The analogy is that when the dog food bag gets low, you go to the store and buy another.

Sifford's study is stuffed with information, focusing on Oregon, but applicable to the whole country, which is often included in his analysis. It is difficult to compress all this information into a newsletter comment without distortion, but basically what he is saying is that bulk sales and full-time use of wood for heating is shifting to processing and packaging for part-time use. For this they pay more, perhaps several times what a load of cordwood would cost when the manufactured product appears on the grocery shelf. He is really down on bulk sales, which face competition from the giants of merchandising such as Wal-mart, K-Mart, and Home Depot. They also buck the rising tide of regulations, not yet present in the SERBEP region but looming in the West and Northeast, against particulate emissions from bulk wood burning: "All of which leads this author to suggest that the biofuels industry not pursue further bulk fuel sales in residential markets. Instead, [the] industry is advised to continue the small unit size (up to 4 pound) product package, with its attendant convenience to the consumer and higher profit margins to producers."

This is perhaps prophetic but scant advice for a sawmill operator wondering what to do with a pile of sawdust. Sifford is, in essence, saying that an entrepreneur with a lot of expensive processing equipment and a contract with Wal-Mart will have to appear and take, or buy, the sawdust and convert it into pellets or logs. This may, in the long run, be the best solution to the small-volume producers that dot the nation who have the waste, but not the capability or inclination to develop a processing and marketing system.

For a free copy of this report, contact John White, Oregon Department of Energy, Facility Regulation Division, 625 Marion Street, NE, Salem, OR 97310, phone (503) 378-3194, fax (503) 373-7806, or email <john.white@state.or.us>.

SULFUR DIOXIDE FOR SALE

Possibly the most significant achievement of the 101st Congress was the passage of comprehensive amendments to the Clean Air Act, last amended in 1977 and bottled up since then by Administration opposition and strong interregional disagreements in Congress. President Bush broke the deadlock in 1989 with a proposal to strengthen existing controls on motor vehicles and large stationary sources (furnaces, smelters, and the like), ozone destroying chemicals, and, not least in the amendments,

control of acid deposition (acid rain) created by emissions of sulfur dioxide (SO_2) and nitrogen oxides (NO_x), which react with the atmosphere to form acids. Congress spent 1989 working out a compromise in a grueling marathon of meetings and reached agreement in October of 1990. Few were pleased with the result but few were violently opposed.

Acid rain often falls far from it's source (New England suffering from SO_2 and NO_x emitted by power plants in the Ohio Valley, for example). "Dirty states" burning high sulfur coal and the states that mined the coal wanted cost sharing among states as in previous legislation to compensate for lost jobs, but Bush was opposed to this type of compensation, calling it a form of taxation. This was also opposed by "clean states" with low emissions, who wanted nothing to do with paying for other peoples' problems or any rigid caps of emissions that would hinder future expansion. Instead, Bush proposed a market-based system of "allowances" that could be granted to utilities that limit SO_2 emissions. This proposal, which eventually became the Acid Rain Program, was a key ingredient in political tradeoffs that eventually cemented the acid rain agreements and thus the landmark Clean Air Act Amendments of 1990 (S 1630. PL 101-540).

The precedent set by this innovative market-driven approach, in contrast to the usual "command and control" U. S. Environmental Protection Agency (EPA) regulations, may set a precedent for similar environmental problems. By being able to capitalize on economic incentives using the most cost-effective approach, conservation and improved technology could be promoted in a way that minimizes the costs to society as well as to the polluters. The total yearly emissions of SO_2 are determined from each generating unit's (each boiler in a complex that may consist of several units, which is common among power stations) monitoring and reporting requirements.

Environmentalists in general disliked this "buying the right to pollute." The ones to complain, however, are probably the miners of West Virginia and Illinois. According to the Energy Information Administration *Electric Power Monthly* of April, 1997, (http://www.eia.doe.gov, click electricity) the system is reducing SO_2 emissions as planned. There has been a reduction of 24 percent between 1990 and 1995 at a cost to utilities of less than one percent of operating expenses. The bad news for eastern coal miners is that 59 percent of the reduction has been due to a switch to low-sulfur coal; only 10 percent of the utilities opted for scrubbers, which remain the highest cost option, and allowances accounted for only 9 percent. The switch to low-sulfur, predominatly Western coal (central Appalachia is still an active player, however) is probably inevitable. An efficient, largely surface mining operation and an efficient transportation system have created an economic structure that is difficult to beat. Low-sulfur coal accounted for 77 percent of utility coal receipts in 1995, up 10 percent from 1990, and there was a corresponding decrease in northern Appalachia and Illinois Basin high-sulfur coal.

In Phase I of the amendments, effective in 1995, EPA allocated allowances to each unit at an emission rate of 2.5 lb/Mbtu of SO_2 based on heat input, a requirement that placed 111 power plants out of compliance. Phase II, effective in 2000, placed a nation-wide emission cap of 8.95 million tons of SO_2 and a reduction to 1.2 pounds per million Btus (lb/MBtu) of SO_2 emissions and incorporates small as well as large emitters excluded in Phase I (which included only plants producing more than 75 MW). Rather than scrambling to achieve compliance, which powerful political forces in the East and Midwest feared would lead to use of low-sulfur Western coal, utilities could use their allotments while they decided what course to take. Anything that reduced SO_2 emissions—customer energy reduction, renewable resources, scrubbers, new and more efficient generating facilitates, or simply sticking with allotments—were all options. Reductions in SO_2 emissions would free their allotments, which could then be sold at, it was hoped, a

Bioenergy Options for Municipalities —The Texas Renewable Energy Industries Association presents a workshop on October 17, 1997, entitled *Bioenergy Options for Municipalities: Making Landfill Gas and Wastewater Methane Pay*. This workshop will explore approaches being used or developed to turn landfills and biomass waste streams, which can be liabilities to a city, into an asset. Topics to be addressed include what and where the resources are; converting landfill gas to electricity or vehicle fuel; using methane from wastewater facilities; project evaluation, development and finance; technical and environmental issues, and governmental policies; and programs to encourage biomass waste-to-energy projects. For details contact Texas Renewable Energy Industries Association, (512) 345-5446, fax (512) 345-6831, or email <rl346@aol.com>.

AFBC Technology Transfer Open House—The $2x10^6$ Btu/hr Atmospheric Fluidized Bed Combustion (AFBC) prototype installed at Cedar Lane Farms will be the focus of a technology transfer open house to be held on October 24, 1997, in Wooster, Ohio. The AFBC at Cedar Lane Farms has been operating for the past two heating seasons providing hot water greenhouse heat. The system is completely automatic from coal and limestone feed into the AFBC to fly-ash spent sorbent removal from the downstream baghouse. Operating labor is estimated at about two hours per day. This free, one-day open house will feature a morning session of technology presentations, followed by lunch and a tour of the AFBC and the greenhouses at Cedar Lane Farms. All open house participants must register in advance. To do so call 1-800-685-2322 or fax (614) 466-6532. Cameras will be permitted.

profit. Smaller units and independent power producers can also "opt in" to the allotment system, usually when they see a profit in reducing SO_2 emissions and selling the allotments.

The Allotment System. The allowances authorize a unit within a utility or industrial source to emit one ton of SO_2 during the current year or any year following. At the end of each year the unit must hold at least 5,000 allowances that are usable in that year. The allowances are fully marketable commodities that can be banked, bought, sold, or traded for future years. EPA issues allowances based on the Phase I and Phase II requirements based on a 2.5 lb/MBtu emission rate for Phase I and 1.2 lb/MBtu for Phase II, multiplied by the unit's baseline emissions in the period 1985-1987. Alternative or additional allowance allocations are made for certain selected units in Illinois, Indiana, and Ohio. EPA is responsible for issuing for tracking the trading of the allowances through their Allowance Tracking System, in which every utility unit, corporate group, or individual holding allowances his assigned an identification number and every allowance a serial number. Holders of allowances must notify EPA to have transfers recorded but it is not necessary to record all transfers until the allowances are used for compliance purposes. Transfers are made by Designated Representatives or Authorized Account Representatives. Thus, EPA maintains an accounting of the flow of allowances.

In addition to the initial allowance issue, a 2.8 percent special reserve is deducted from the original allowances. For example, a unit eligible for 10,000 allowances would receive only 9,750 allowances. Allowances in the special reserve are available for direct sale at $1,500 per allowance, with independent power producers having priority access to direct sales. The remaining special reserves are sold at open auction held every year no later than March 31. These auctions have been held annually since 1993. The unit of trade is 25 one-ton SO_2 emission allowances.

The actual transfer of allowances is administered by the Chicago Board of Trade (CBOT), the world's oldest and largest futures exchange, a situation specified in the legislation that allows EPA to contract with a non-governmental organization to handle market activities. The CBOT administers the yearly allowance auction, operates an allowance cash market and a futures market, and provides allowance information. The futures market is a particularly important part of the CBOT activities. It provides a means of locking in the cost of allowances months or years in the future, thus avoiding potential adverse price fluctuations, the common practice of "hedging." Power companies can thus purchase futures secure in the knowledge of what the cost is going to be and make their financial plans accordingly. In comparing the options of installing scrubbers or buying allotments, for example, the economics of each course of action can be calculated with greater confidence. The absence of a futures market can lead to wide price variations such as those familiar to the recycled materials market.

Similarly, a low-cost flexible cash market with an efficient pay and collect system, easy access to bid, offer, and other trade information is also essential for easy access to daily buying and selling of allowances to meet short-term needs.The CBOT provides these facilities and guarantees all trade through the Board of Trade Clearing Corporation.

The Yearly Auction. Auctions by the CBOT have been held on the 3rd Monday of March since 1993. Bids, accompanied by full payment in the form of certified checks or letters of credit, are submitted prior to the auction. Both spot allowances usable in the year of purchase and allowances usable 7 years from the date of purchase are auctioned. The allowances from the EPA reserve are auctioned first, beginning with the highest bid and continuing until the all of the allowances have been sold or the bids exhausted. Allowances from private bidders are then auctioned beginning with the lowest priced offers and continuing until the of-

CALENDAR OF EVENTS

October 14-16, 1997
Jakarta, Indonesia
The Asia-Pacific Initiative for Renewable Energy & Energy Efficiency, Partnerships in Power for the Next Millennium
ADA Ltd, 5/f, 3 Wood Road, Wanchai, Hong Kong
fax: +852-2574-1997

October 17, 1997
Austin, Texas
Bioenergy Options for Municipalities: Making Landfill Gas and Wastewater Methane Pay
Texas Renewable Energy Industries Association
tel: (512) 345-5446
fax: (512) 345-6831
email: rl346@aol.com

October 24, 1997
Cedar Lane Farms, Wooster, Ohio
Atmospheric Fluidized Bed Combustor Technology Transfer Open House
tel: 1-800-685-2322
fax: (614) 466-6532

November 2-7, 1997
Kona, Hawaii
The Impact of Mineral Impurities in Solid Fuel Combustion
Engineering Foundation Conferences, 345 E. 47th Street
New York, NY 10017
tel: (212) 705-7836
fax: (212) 705-7441
email: engfnd@aol.com

November 3, 1997
Saratoga Springs, New York
Producing Energy from Landfill Gas
New York Landfill Gas Workshop
P.O. Box 5665, 22 Church St.
Burlington, VT 05402
tel: (802) 658-9385
fax: (802) 862-1514

November 4-6, 1997
Washington, DC
Annual CPBR Biomass Research Symposium
Dorin Schumacher
Consortium for Plant Biotechnology Research, Inc.
tel: (912) 638-4900
fax: (912) 638-7788
email: CPBR@compuserve.com

November 6-8, 1997
Waco, Texas
2nd International Conference on Alternative Aviation Fuels
tel: (817) 755-3563
fax: (817) 755-3560
email: AVS_Office@baylor.edu

November 19, 1997
Jekyll Island, Georgia
Dealing with the New Mandates-Georgia Landfill Gas Workshop
Stephanie Hubbard
tel: (770) 822-9308

December 10-11, 1997
Philadelphia, Pennsylvania
Developing Landfill Gas-To-Energy Projects in a Changing Marketplace
Lisa Morgan
tel: (301) 468-8441
email: lmorgan@perihq.com

1998

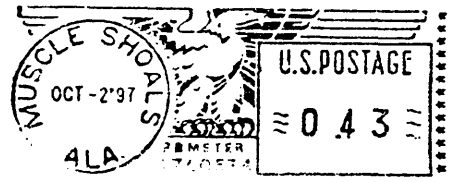
January 20-22, 1998
New Delhi, India
International Conference on Fly Ash Disposal & Utilisation
C.F.J. Varma, Central Board of Irrigation & Power, Malcha Marg, Chanakyapuri, New Delhi-110021
INDIA

February 28-March 3, 1998
San Antonio, Texas
NWPCA Annual Leadership Conference and Exposition
Lisa Ness, National Wooden Pallet and Container Association, 1800 North Kent St., Suite 911
Arlington, VA 22209-2109
tel: (703) 527-7667
fax: (703) 527-7717
email: palletmtgs@aol.com

June 8-11, 1998
Wurzburg, Germany
Biomass for Energy and Industry, 10th European Conf. and Tech. Exhibition
C.A.R.M.E.N.e.V.
Technologiepark 13, D-97222 Rimpar bei Wurzburg, GERMANY
fax: +49-9365-806955

October 4-8, 1998
Madison, Wisconsin
Bioenergy '98
Don Wichert
Wisconsin Energy Bureau
P.O. Box 7868, 101 E. Wilson,
Madison, WI 53707
tel: (608) 266-7312
fax: (608) 267-6931
email: wiched@mail.state.wi.us

SERBEP Update
Southeastern Regional Biomass Energy Program
Tennessee Valley Authority, CEB 3A
Reservation Road
P.O. Box 1010
Muscle Shoals, AL 35662-1010
(Non-US Postal Service Zip Code 35661)



CLEAN CITIES HOTLINE
NREL
1617 COLE BLVD, BLDG. 16
GOLDEN, CO 80401-3305
USA

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fers or the bids are depleted, or the minimum price for the next set offered exceeds the bid price of the previous set.

The trade in allotments may not have been what the EPA expected when the program was initiated. EPA estimated that they would sell in the $600- to $800-per-ton of SO_2 range of the estimated cost of adding scrubbers. Instead, the 1993 auction produced an average price of about $150, then slowly declined to about $70 in the 1995 auction, after which a slow increase began, reaching about $110 in 1997 when 150,000 allowances were available for use in 1997 and 150,000 were available for allotments usable in 2003 and 2004. Bids were submitted for 129,000 allowances, of which 25,000 were sold. There were 9 successful bids and 47 unsuccessful bids. As an interesting side effect, many environmental and civic groups and schools have been active buyers. They withdrew the allotments from circulation to force emission reductions rather than the use of allotments.

While it is still too early to assess the success of the allotment program, these results suggest there is no shortage of allotments, nor do they reflect the private trade in allotments. School still seems to be out on this innovative method of environmental control, which may or may not expand into other areas of pollution control. Much has been written in the popular and scholarly press about the use of allotments, but on the whole the comments have been favorable. In the Winter 1996 issue of *Resources for the Future*, for example, the apparent low level of trade in allotments is attributed to the success of the program, in which utilities have found many ways of controlling SO_2 emissions without relying on allotments, and to fundamental changes in the coal transportation and scrubber industries that favor other low-cost options.

Further information on the Acid Rain Program is available from EPA through the Acid Rain Hotline at (617) 674-7377 or the Public Information Center at (202) 260 2080 and the CBOT Education & Marketing Services Department at (312) 341-7955.